

ABSTRACT**Fence-Free Etching of an Iridium Barrier Having a Steep Taper Angle**

5 An Iridium barrier layer is between a contact plug and a bottom electrode
of a capacitor. Etching is performed to pattern the bottom electrode and barrier
layer using a fluorine-based recipe resulting in the formation of a first fence
clinging to the sidewalls. Next the remaining barrier layer is etched using a CO-
based recipe. A second fence is formed clinging to and structurally supported
10 by the first fence. At the same time, the CO-based recipe etches away a
substantial portion of the first fence to remove the structural support provided to
the second fence. The second fence is therefore lifted-off from the sidewalls
leaving the sidewalls substantially free of clinging fences. The etched barrier
layer has a sidewall transition. The sidewalls have a relatively low taper angle
15 above the sidewall transition and a relatively steep taper angle below the
sidewall transition.

Fig. 6